

# DFL Direct Fired Gas Heating System

**Technical Guide for:**

**Outdoor or Indoor  
Mounted Units  
To 16,000 CFM  
And 1.97M BTUH**



**Applied Air**





**Keeps You**

**Warm**



**Applied Air**



# DFL Direct Fired Gas Heating System Technical Guide

## Applied Air

In the business of commercial and industrial operations, efficient and low-cost heating is essential. Applied Air keeps you warm for less.

Since 1975, Applied Air has been providing cost-effective, reliable gas heating solutions. Our proven Direct Fired Gas Heating System adds warm, fresh and clean air to your work environment for greater comfort and productivity.

This Technical Guide will help you choose an Applied Air Direct Fired Gas Heating System to provide efficient, cost-effective heating for your kitchen, warehouse, factory or process operation. The Guide covers:

- Technical Specifications — Configure the right system components (e.g., burner, motors, drive, filter, options, etc.) to meet your needs.
- Installation Information — Plan details of on-site installation with dimensional information, unit weights and cabinet arrangement diagrams.

If you have questions, please contact Applied Air's Customer Service Department at 214-638-6010. We'll be glad to help.

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**Keeps You**

**Warm**

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# Air Delivery Table

## 035 & 070 Models

Unit Model	SCFM	Total Static Pressure (W.C.)									
		1 <sup>1</sup> / <sub>4</sub> " HP	1 <sup>1</sup> / <sub>2</sub> " HP	1 <sup>3</sup> / <sub>4</sub> " HP	2" HP	2 <sup>1</sup> / <sub>4</sub> " HP	2 <sup>1</sup> / <sub>2</sub> " HP	2 <sup>3</sup> / <sub>4</sub> " HP	3" HP	3 <sup>1</sup> / <sub>4</sub> " HP	3 <sup>1</sup> / <sub>2</sub> " HP
Model 035 10 x 10 Wheel	2000	1	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	—	—	—	—	—	—	—
	2250	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	2	2	—	—	—	—	—
	2500	1 <sup>1</sup> / <sub>2</sub>	2	2	2	3	3	3	—	—	—
	2750	2	2	3	3	3	3	3	3	5	5
	3000	2	3	3	3	3	3	5	5	5	5
	3250	3	3	3	3	5	5	5	5	5	5
	3500	3	3	3	5	5	5	5	5	5	5
Model 070 12 x 12 Wheel	3750	3	3	3	3	—	—	—	—	—	—
	4000	3	3	3	3	5	—	—	—	—	—
	4250	3	3	5	5	5	5	—	—	—	—
	4500	3	5	5	5	5	5	5	5	7 <sup>1</sup> / <sub>2</sub>	—
	4750	—	—	5	5	5	5	5	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>
	5000	—	—	—	5	5	5	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>
	5250	—	—	—	—	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>
	5500	—	—	—	—	—	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>
	5750	—	—	—	—	—	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	—	—
	6000	—	—	—	—	—	—	—	—	—	—
	6250	—	—	—	—	—	—	—	—	—	—
	6500	—	—	—	—	—	—	—	—	—	—
	6750	—	—	—	—	—	—	—	—	—	—
	7000	—	—	—	—	—	—	—	—	—	—
Model 070 15 x 15 Wheel	3750	—	—	—	—	—	—	—	—	—	—
	4000	—	—	—	—	—	—	—	—	—	—
	4250	—	—	—	—	—	—	—	—	—	—
	4500	—	—	—	—	—	—	—	—	—	—
	4750	3	3	—	—	—	—	—	—	—	—
	5000	3	3	5	—	—	—	—	—	—	—
	5250	3	5	5	5	—	—	—	—	—	—
	5500	3	5	5	5	5	—	—	—	—	—
	5750	5	5	5	5	5	—	—	—	—	—
	6000	5	5	5	5	5	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	—	—	—
	6250	5	5	5	5	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	—	—	—
	6500	5	5	5	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	—	—
	6750	5	5	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	10	—
	7000	5	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	10	10	10

### NOTE:

Horsepower selections are based on system total static pressure. One or more of the following must be added when applicable. See pressure drops on page 6 for burner section and optional inlet hood and V-bank sections.

- A. Fresh Air Inlet Hood & Birdscreen — W.C.
- B. Fresh Air Inlet Hood with Filters — W.C.
- C. V-Bank Filter Section — W.C.
- F. Burner Section — W.C.

### SELECTION GUIDE

1. Determine the required amount of replacement air (CFM) by computing the total amount of air being exhausted. (Restaurants should be sized for 90% of exhaust air to minimize food odors.)
2. Determine the total external static pressure by adding the pressure drops through all accessories and ducts.
3. Select unit size and motor horsepower from table.

# Air Delivery Table

## 110 & 160 Models

Unit Model	SCFM	Total Static Pressure (W.C.)									
		1 1/4" HP	1 1/2" HP	1 3/4" HP	2" HP	2 1/4" HP	2 1/2" HP	2 3/4" HP	3" HP	3 1/4" HP	3 1/2" HP
Model 110 18 x 18 Wheel	7,250	5	5	5	5	7 1/2	—	—	—	—	—
	7,500	5	5	5	5	7 1/2	—	—	—	—	—
	7,750	5	5	5	7 1/2	7 1/2	7 1/2	—	—	—	—
	8,000	5	5	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	—	—	—
	8,250	5	5	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	10	—	—
	8,500	5	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	10	10	—	—
	8,750	5	7 1/2	7 1/2	7 1/2	7 1/2	10	10	10	10	—
	9,000	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	10	10	10	10	15
	9,250	7 1/2	7 1/2	7 1/2	7 1/2	10	10	10	10	10	15
	9,500	7 1/2	7 1/2	7 1/2	7 1/2	10	10	10	10	15	15
	9,750	7 1/2	7 1/2	7 1/2	10	10	10	10	10	15	15
	10,000	7 1/2	7 1/2	10	10	10	10	10	15	15	15
	10,500	7 1/2	10	10	10	10	10	15	15	15	15
	11,000	10	10	10	10	15	15	15	15	15	15
Model 160 20 x 20 Wheel	11,500	10	10	10	—	—	—	15	15	15	15
	12,000	10	—	—	—	—	15	15	15	15	—
	12,500	—	—	—	—	15	15	15	—	—	—
	13,000	—	—	—	—	15	15	—	—	—	—
	13,500	—	—	—	—	—	—	—	—	—	—
	14,000	—	—	—	—	—	—	—	—	—	—
	14,500	—	—	—	—	—	—	—	—	—	—
	15,000	—	—	—	—	—	—	—	—	—	—
	15,500	—	—	—	—	—	—	—	—	—	—
	16,000	—	—	—	—	—	—	—	—	—	—
Model 160 22 x 22 Wheel	11,500	—	—	—	10	10	10	—	—	—	—
	12,000	—	7 1/2	10	10	10	—	—	—	—	15
	12,500	7 1/2	10	10	10	—	—	—	15	15	15
	13,000	10	10	10	10	—	—	15	15	15	20
	13,500	10	10	10	10	15	15	15	15	15	20
	14,000	10	10	15	15	15	15	15	15	15	20
	14,500	10	15	15	15	15	15	15	20	20	20
	15,000	15	15	15	15	15	15	20	20	20	20
	15,500	15	15	15	15	15	20	20	20	20	20
	16,000	15	15	15	15	20	20	20	20	20	20

# Air Pressure Drop Table

All Models												
Unit Model	SCFM	Inlet Hood			Filter Section							Discharge Nozzle
		No Filters	With 1" Cleanable Filters	With 2" Cleanable Filters	No Filters	With 1" TAW Filters	With 1" Pleated Filters	With 1" Cleanable Filters	With 2" TAW Filters	With 2" Pleated Filters	With 2" Cleanable Filters	
035	2000	0.010	0.044	0.050	0.010	0.030	0.055	0.024	0.030	0.028	0.035	0.13
	2250	0.010	0.060	0.070	0.010	0.042	0.080	0.035	0.045	0.045	0.048	0.16
	2500	0.010	0.079	0.090	0.010	0.050	0.105	0.046	0.060	0.063	0.060	0.20
	2750	0.010	0.095	0.110	0.010	0.062	0.125	0.056	0.075	0.078	0.073	0.24
	3000	0.010	0.115	0.130	0.010	0.073	0.150	0.067	0.090	0.095	0.085	0.29
	3250	0.010	0.130	0.150	0.010	0.083	0.175	0.078	0.105	0.113	0.098	0.34
	3500	0.010	0.148	0.170	0.010	0.093	0.200	0.088	0.120	0.130	0.110	0.39
070	3750	0.009	0.060	0.040	0.000	0.065	0.100	0.048	0.060	0.105	0.058	0.17
	4000	0.010	0.065	0.055	0.000	0.078	0.120	0.060	0.075	0.120	0.070	0.19
	4250	0.012	0.073	0.070	0.000	0.090	0.139	0.072	0.088	0.140	0.081	0.22
	4500	0.013	0.080	0.080	0.000	0.102	0.158	0.083	0.100	0.155	0.092	0.24
	4750	0.014	0.090	0.095	0.000	0.115	0.175	0.095	0.114	0.175	0.105	0.27
	5000	0.015	0.100	0.110	0.000	0.125	0.194	0.110	0.128	0.190	0.118	0.30
	5250	0.017	0.110	0.125	0.000	0.138	0.213	0.120	0.140	0.205	0.130	0.33
	5500	0.018	0.125	0.135	0.000	0.150	0.231	0.133	0.153	0.225	0.140	0.37
	5750	0.019	0.135	0.150	0.000	0.163	0.250	0.145	0.168	0.245	0.153	0.40
	6000	0.021	0.150	0.163	0.000	0.175	0.269	0.158	0.180	0.260	0.165	0.31
	6250	0.022	0.170	0.175	0.000	0.185	0.275	0.170	0.192	0.275	0.178	0.33
	6500	0.024	0.185	0.190	0.000	0.200	0.305	0.183	0.205	0.295	0.189	0.36
	6750	0.025	0.195	0.205	0.000	0.210	0.325	0.195	0.220	0.310	0.200	0.39
	7000	0.026	0.210	0.215	0.000	0.223	0.345	0.210	0.232	0.330	0.212	0.42
110	7250	0.080	0.175	0.190	0.000	0.095	0.280	0.135	0.160	0.205	0.145	0.19
	7500	0.085	0.193	0.205	0.000	0.100	0.300	0.150	0.172	0.225	0.149	0.20
	7750	0.093	0.210	0.220	0.000	0.105	0.320	0.160	0.185	0.240	0.160	0.22
	8000	0.100	0.225	0.240	0.000	0.110	0.340	0.175	0.200	0.255	0.175	0.23
	8250	0.108	0.240	0.260	0.000	0.120	0.360	0.190	0.210	0.275	0.185	0.25
	8500	0.115	0.260	0.275	0.000	0.125	0.375	0.200	0.225	0.290	0.200	0.26
	8750	0.120	0.275	0.295	0.000	0.130	0.395	0.215	0.240	0.310	0.215	0.28
	9000	0.128	0.290	0.310	0.000	0.135	0.410	0.225	0.250	0.325	0.225	0.29
	9250	0.135	0.310	0.330	0.000	0.140	0.430	0.240	0.265	0.340	0.240	0.31
	9500	0.140	0.325	0.345	0.000	0.145	0.450	0.250	0.278	0.360	0.253	0.33
	9750	0.148	0.340	0.365	0.000	0.153	0.470	0.265	0.290	0.375	0.265	0.35
	10,000	0.155	0.360	0.380	0.000	0.158	0.490	0.280	0.305	0.395	0.280	0.36
	10,500	0.162	0.375	0.410	0.000	0.163	0.510	0.290	0.315	0.410	0.290	0.40
	11,000	0.170	0.390	0.450	0.000	0.170	0.525	0.305	0.330	0.425	0.305	0.44
160	11,500	0.110	0.130	0.130	0.024	0.148	0.258	0.148	0.150	0.230	0.180	0.35
	12,000	0.118	0.145	0.150	0.032	0.178	0.300	0.180	0.192	0.265	0.210	0.38
	12,500	0.125	0.155	0.165	0.036	0.185	0.320	0.195	0.212	0.285	0.230	0.42
	13,000	0.135	0.165	0.182	0.040	0.210	0.342	0.210	0.235	0.300	0.245	0.45
	13,500	0.143	0.178	0.200	0.044	0.225	0.364	0.225	0.255	0.320	0.260	0.33
	14,000	0.150	0.190	0.215	0.048	0.242	0.385	0.242	0.275	0.335	0.280	0.36
	14,500	0.160	0.200	0.232	0.052	0.260	0.410	0.260	0.295	0.355	0.295	0.39
	15,000	0.170	0.213	0.250	0.056	0.275	0.425	0.275	0.320	0.370	0.315	0.41
	15,500	0.175	0.225	0.265	0.060	0.290	0.448	0.290	0.340	0.390	0.330	0.44
	16,000	0.185	0.238	0.282	0.064	0.305	0.468	0.305	0.360	0.405	0.345	0.47

Burner Section	
Model	Pressure Drop
035	0.680
070	0.710
110	0.890
160	0.890

# Burner Performance Table

All Models								
Unit Size	SCFM	70° Rise	80° Rise	90° Rise	100° Rise	110° Rise	120° Rise	130° Rise
Model 035	2000	177	199	219	239	258	276	294
	2250	200	224	247	269	290	311	330
	2500	222	248	274	299	322	345	367
	2750	244	273	301	328	354	380	404
	3000	266	298	329	358	387	414	440
	3250	288	323	356	388	419	449	477
	3500	311	348	384	418	451	483	514
Model 070	3750	333	373	411	448	483	518	550
	4000	355	397	438	478	516	552	587
	4250	377	422	466	508	548	587	624
	4500	399	447	493	537	580	621	661
	4750	421	472	521	567	612	656	697
	5000	444	497	548	597	644	690	734
	5250	466	522	575	627	677	725	771
	5500	488	546	603	657	709	759	807
	5750	510	571	630	687	741	794	844
	6000	532	596	658	717	773	828	881
	6250	554	621	685	746	806	863	917
	6500	577	646	712	776	838	897	954
	6750	599	671	740	806	870	932	991
	7000	621	696	767	836	902	966	1027
Model 110	7250	643	720	795	866	934	1001	1064
	7500	665	745	822	896	967	1035	1101
	7750	688	770	849	926	999	1070	1138
	8000	710	795	877	955	1031	1104	1174
	8250	732	820	904	985	1063	1139	1211
	8500	754	845	932	1015	1096	1173	1248
	8750	776	869	959	1045	1128	1208	1284
	9000	798	894	986	1075	1160	1242	1321
	9250	821	919	1014	1105	1192	1277	1358
	9500	843	944	1041	1135	1224	1311	1394
	9750	865	969	1068	1164	1257	1346	1431
	10,000	887	994	1096	1194	1289	1380	1468
	10,500	932	1043	1151	1254	1353	1449	1541
	11,000	976	1093	1205	1314	1418	1518	1615
Model 160	11,500	1020	1143	1260	1373	1482	1587	1688
	12,000	1065	1192	1315	1433	1547	1656	1761
	12,500	1109	1242	1370	1493	1611	1725	1835
	13,000	1153	1292	1425	1553	1676	1794	1908
	13,500	1198	1341	1479	1612	1740	1863	—
	14,000	1242	1391	1534	1672	1804	1932	—
	14,500	1286	1441	1589	1732	1869	—	—
	15,000	1331	1490	1644	1791	1933	—	—
	15,500	1375	1540	1699	1851	—	—	—
	16,000	1419	1590	1753	1911	—	—	—

## SELECTION GUIDE

- Determine the temperature rise required through the heater by subtracting the winter design temperature from the desired indoor temperature.
- Select burner required.  

$$BTUH = \frac{SCFM \times 1.32605 \times 29.92 \times 0.24 \times 60 \times \text{Temperature Rise}}{.92 (460 + \text{Temperature Rise} + \text{Inlet Temperature})}$$

where 1.32605 = density of air handled by the blower  
29.92 = barometric pressure at sea level  
0.24 = specific heat of the air handled by the blower  
60 = conversion for minutes to hour  
0.92 = average ratio of net and gross heating values of common fuel gases (92% sensible, 8% latent)
- Values shown in above MBH Input Table are based on -40° F Inlet Temperature. MBH input shown on unit rating plate will be corrected for actual air density.
- Natural gas units are limited to 130° F temperature rise, propane units are limited to 100° F temperature rise.

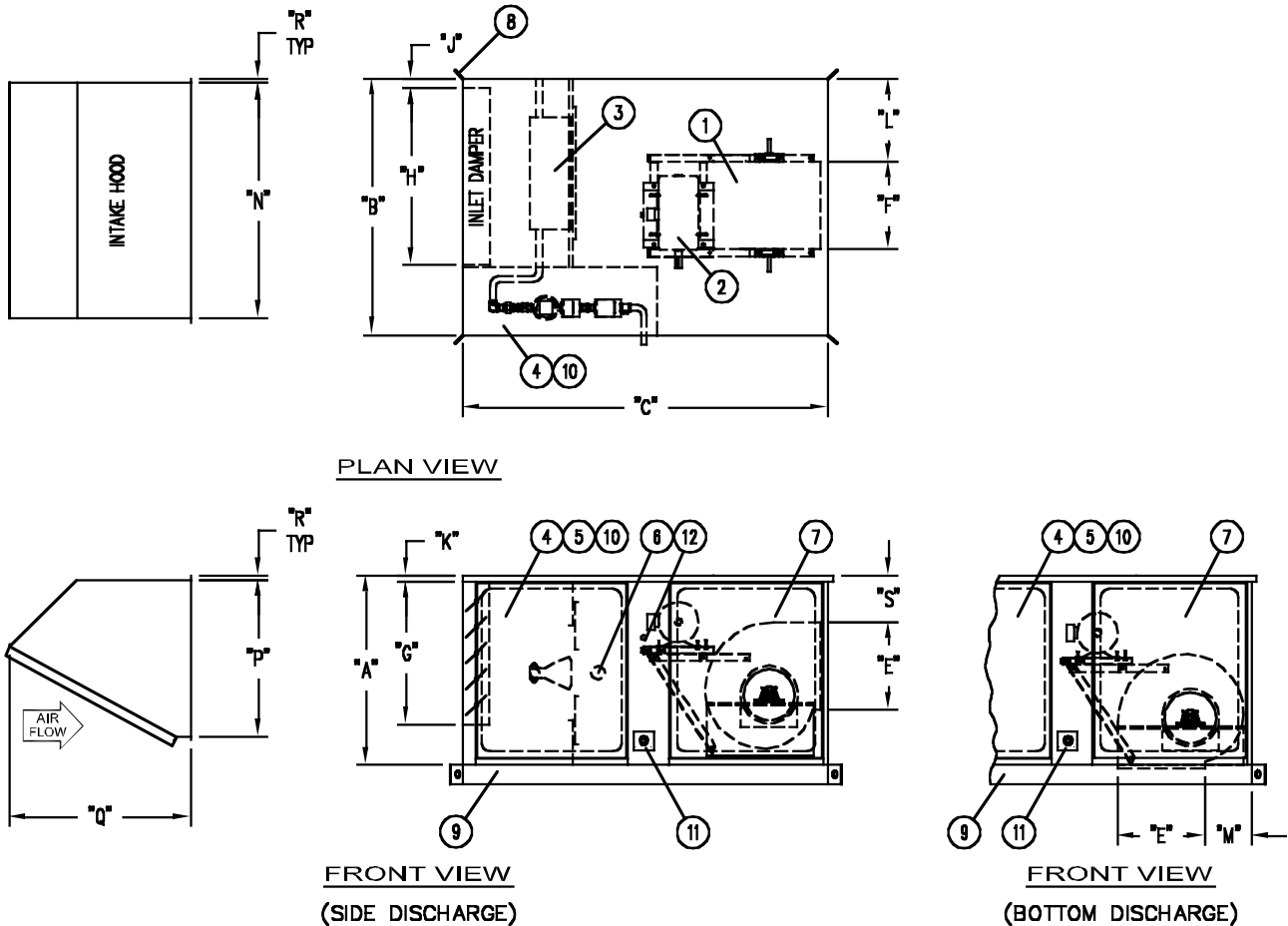
# Dimensions

## Horizontal Base Unit without V-Bank

C000506

### UNIT COMPONENTS

- |                           |                                       |                |                           |
|---------------------------|---------------------------------------|----------------|---------------------------|
| 1. Centrifugal supply fan | 4. Control cabinet                    | 7. Access door | 10. Manifold compartment  |
| 2. Fan motor              | 5. Hinged control cabinet access door | 8. Lifting lug | 11. Gas connection        |
| 3. Line burner            | 6. Observation port                   | 9. Unit base   | 12. Electrical connection |



RIGHT HAND SHOWN, LEFT HAND IS OPPOSITE

Model	Blower Size	Dimensions								
		A	B	C	E	F	G	H	J	K
035	10" x 10"	36	42	68	11 <sup>3</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>8</sub>	25 <sup>1</sup> / <sub>2</sub>	27	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>
070	12" x 12"	40	52	76	13 <sup>7</sup> / <sub>16</sub>	15 <sup>5</sup> / <sub>8</sub>	30 <sup>1</sup> / <sub>4</sub>	37 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>
	15" x 15"	40	52	76	15 <sup>7</sup> / <sub>8</sub>	18 <sup>5</sup> / <sub>8</sub>	30 <sup>1</sup> / <sub>4</sub>	37 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>
110	18" x 18"	48	64	82	18 <sup>7</sup> / <sub>8</sub>	21 <sup>7</sup> / <sub>8</sub>	35 <sup>1</sup> / <sub>4</sub>	47 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>
160	20" x 20"	48	64	92	24 <sup>3</sup> / <sub>4</sub>	24 <sup>3</sup> / <sub>4</sub>	39 <sup>1</sup> / <sub>4</sub>	47 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>
	22" x 22"	48	64	92	27 <sup>1</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>4</sub>	39 <sup>1</sup> / <sub>4</sub>	47 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>
Model	Blower Size	Dimensions							Filters Hood Qty - Size	
		L	M	N	P	Q	R	S		
035	10" x 10"	14 <sup>7</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>8</sub>	40 <sup>1</sup> / <sub>16</sub>	25 <sup>5</sup> / <sub>8</sub>	27 <sup>7</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	16 <sup>7</sup> / <sub>16</sub>		
070	12" x 12"	18 <sup>3</sup> / <sub>16</sub>	9 <sup>5</sup> / <sub>16</sub>	50 <sup>1</sup> / <sub>16</sub>	30 <sup>5</sup> / <sub>8</sub>	41 <sup>13</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	17 <sup>3</sup> / <sub>16</sub>		
	15" x 15"	16 <sup>11</sup> / <sub>16</sub>	10 <sup>11</sup> / <sub>16</sub>	50 <sup>1</sup> / <sub>16</sub>	30 <sup>5</sup> / <sub>8</sub>	41 <sup>13</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	13 <sup>5</sup> / <sub>16</sub>		
110	18" x 18"	21 <sup>1</sup> / <sub>16</sub>	12 <sup>5</sup> / <sub>16</sub>	62 <sup>1</sup> / <sub>16</sub>	35 <sup>5</sup> / <sub>8</sub>	48 <sup>7</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>8</sub>	16 <sup>11</sup> / <sub>16</sub>		
160	20" x 20"	19 <sup>5</sup> / <sub>8</sub>	13	62 <sup>1</sup> / <sub>16</sub>	44 <sup>7</sup> / <sub>8</sub>	72 <sup>3</sup> / <sub>4</sub>	7 <sup>7</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>4</sub>		
	22" x 22"	18 <sup>3</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>16</sub>	62 <sup>1</sup> / <sub>16</sub>	44 <sup>7</sup> / <sub>8</sub>	72 <sup>3</sup> / <sub>4</sub>	7 <sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>		

**NOTE:** All dimensions in inches subject to manufacturing tolerances.



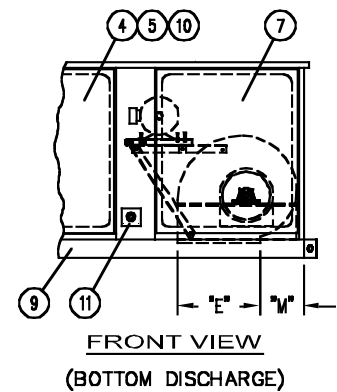
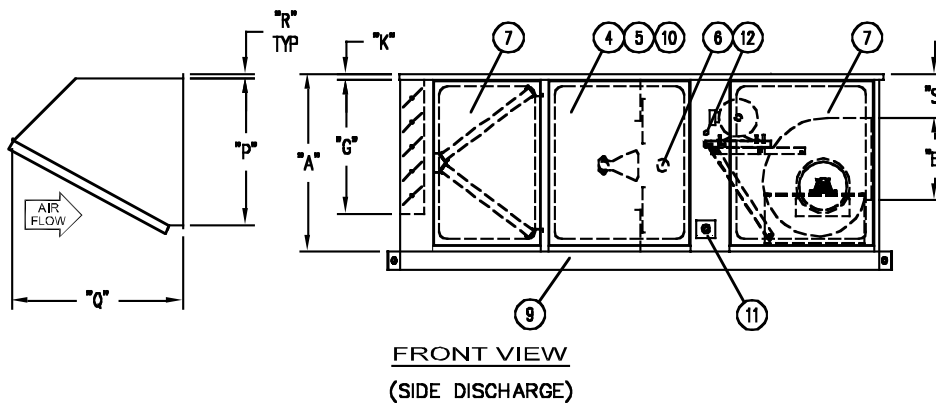
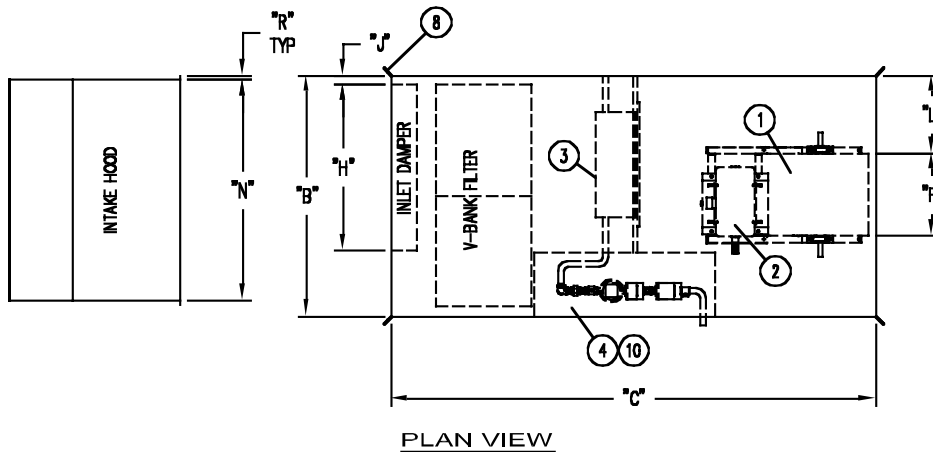
# Dimensions

## Horizontal Base Unit with V-Bank

C000505

### UNIT COMPONENTS

- |                           |                                       |                |                           |
|---------------------------|---------------------------------------|----------------|---------------------------|
| 1. Centrifugal supply fan | 4. Control cabinet                    | 7. Access door | 10. Manifold compartment  |
| 2. Fan motor              | 5. Hinged control cabinet access door | 8. Lifting lug | 11. Gas connection        |
| 3. Line burner            | 6. Observation port                   | 9. Unit base   | 12. Electrical connection |



RIGHT HAND SHOWN, LEFT HAND IS OPPOSITE

Model	Blower Size	Dimensions									
		A	B	C	E	F	G	H	J	K	
035	10" x 10"	36	42	100	11 <sup>3</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>8</sub>	25 <sup>1</sup> / <sub>2</sub>	27	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	
070	12" x 12"	40	52	108	13 <sup>7</sup> / <sub>16</sub>	15 <sup>5</sup> / <sub>8</sub>	30 <sup>1</sup> / <sub>4</sub>	37 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	
	15" x 15"	40	52	108	15 <sup>7</sup> / <sub>8</sub>	18 <sup>5</sup> / <sub>8</sub>	30 <sup>1</sup> / <sub>4</sub>	37 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	
110	18" x 18"	48	64	114	18 <sup>7</sup> / <sub>8</sub>	21 <sup>7</sup> / <sub>8</sub>	35 <sup>1</sup> / <sub>4</sub>	47 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	
160	20" x 20"	48	64	124	24 <sup>3</sup> / <sub>4</sub>	24 <sup>3</sup> / <sub>4</sub>	39 <sup>1</sup> / <sub>4</sub>	47 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	
	22" x 22"	48	64	124	27 <sup>1</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>4</sub>	39 <sup>1</sup> / <sub>4</sub>	47 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	
Model	Blower Size	Dimensions									
		L	M	N	P	Q	R	S	Filter Hood Qty - Size	Filter V-Bank Qty - Size	
035	10" x 10"	14 <sup>7</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>8</sub>	40 <sup>1</sup> / <sub>16</sub>	25 <sup>5</sup> / <sub>8</sub>	27 <sup>7</sup> / <sub>16</sub>	<sup>7</sup> / <sub>8</sub>	16 <sup>7</sup> / <sub>16</sub>	2) 20" x 25"	4) 20" x 20"	
070	12" x 12"	18 <sup>3</sup> / <sub>16</sub>	9 <sup>5</sup> / <sub>16</sub>	50 <sup>1</sup> / <sub>16</sub>	30 <sup>5</sup> / <sub>8</sub>	41 <sup>13</sup> / <sub>16</sub>	<sup>7</sup> / <sub>8</sub>	17 <sup>3</sup> / <sub>16</sub>	6) 16" x 20"	6) 16" x 25"	
	15" x 15"	16 <sup>11</sup> / <sub>16</sub>	10 <sup>11</sup> / <sub>16</sub>	50 <sup>1</sup> / <sub>16</sub>	30 <sup>5</sup> / <sub>8</sub>	41 <sup>13</sup> / <sub>16</sub>	<sup>7</sup> / <sub>8</sub>	13 <sup>5</sup> / <sub>16</sub>			
110	18" x 18"	21 <sup>1</sup> / <sub>16</sub>	12 <sup>5</sup> / <sub>16</sub>	62 <sup>1</sup> / <sub>16</sub>	35 <sup>5</sup> / <sub>8</sub>	48 <sup>7</sup> / <sub>8</sub>	<sup>7</sup> / <sub>8</sub>	16 <sup>11</sup> / <sub>16</sub>	6) 20" x 25"	6) 20" x 25"	
160	20" x 20"	19 <sup>5</sup> / <sub>8</sub>	13	62 <sup>1</sup> / <sub>16</sub>	44 <sup>7</sup> / <sub>8</sub>	72 <sup>3</sup> / <sub>4</sub>	<sup>7</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>4</sub>	9) 20" x 25"	12) 20" x 20"	
	22" x 22"	18 <sup>3</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>16</sub>	62 <sup>1</sup> / <sub>16</sub>	44 <sup>7</sup> / <sub>8</sub>	72 <sup>3</sup> / <sub>4</sub>	<sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>			

**NOTE:** All dimensions in inches subject to manufacturing tolerances.

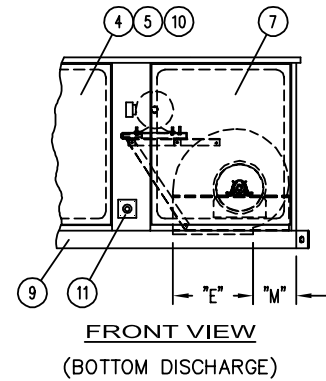
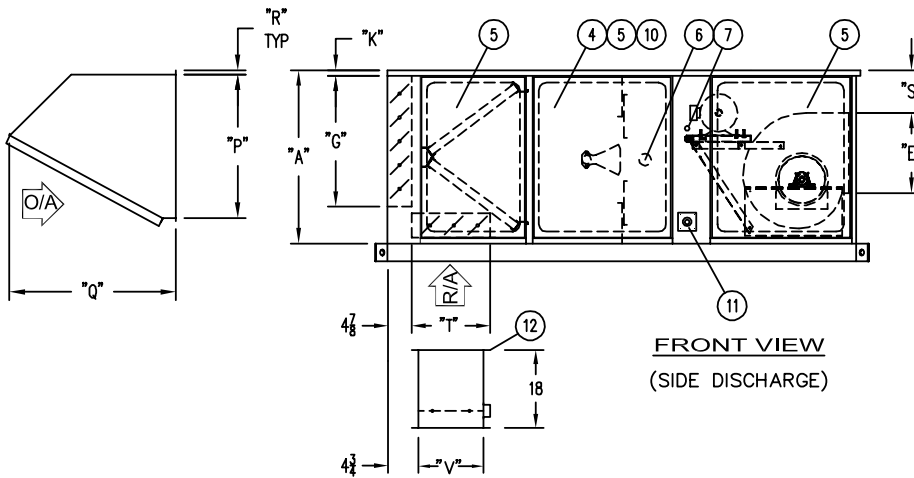
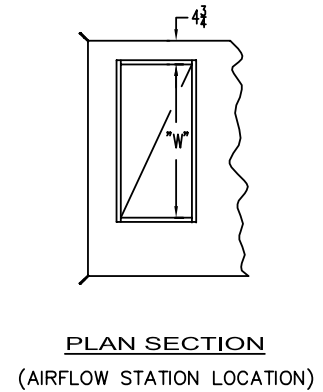
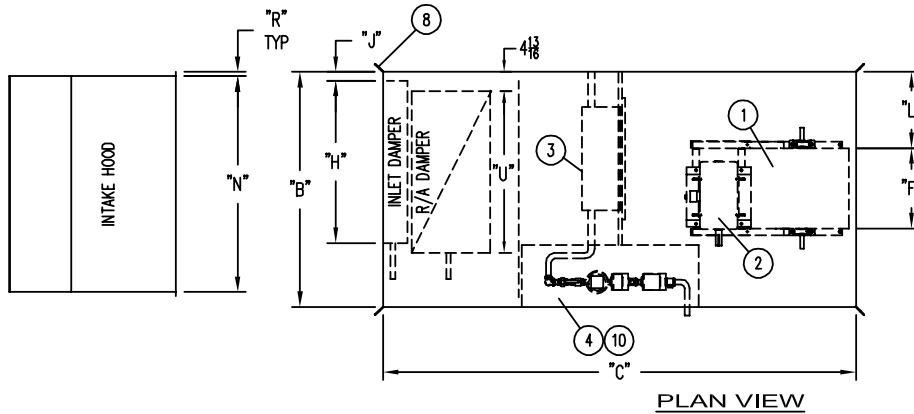
# Dimensions

## Horizontal Base Unit with V-Bank and Mixing Dampers

C000544

### UNIT COMPONENTS

- |                           |                       |                          |                          |
|---------------------------|-----------------------|--------------------------|--------------------------|
| 1. Centrifugal supply fan | 4. Control cabinet    | 7. Electrical connection | 10. Manifold compartment |
| 2. Fan motor              | 5. Hinged access door | 8. Lifting lug           | 11. Gas connection       |
| 3. Line burner            | 6. Observation port   | 9. Unit base             | 12. Airflow station      |



RIGHT HAND SHOWN, LEFT HAND IS OPPOSITE

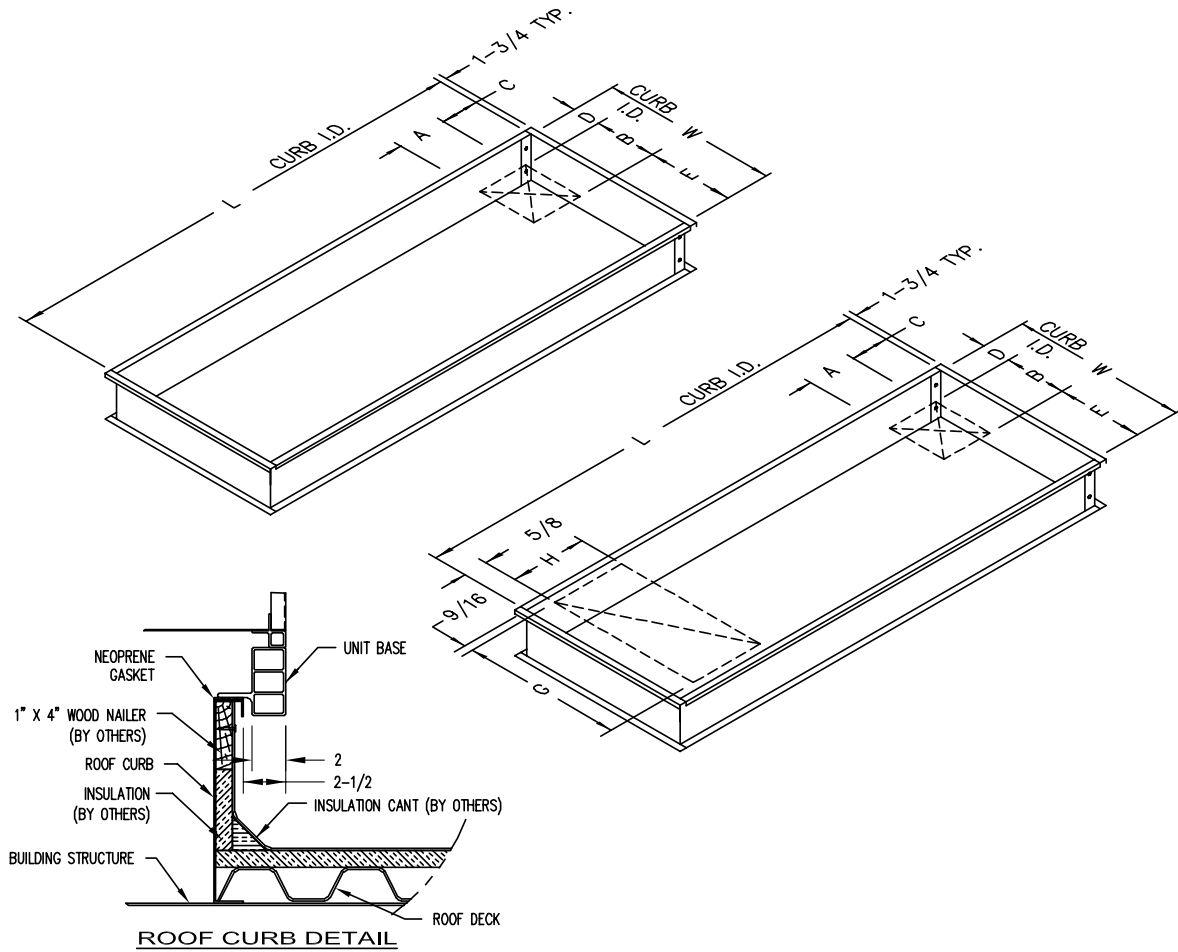
Model	Blower Size	Dimensions										
		A	B	C	E	F	G	H	J	K	L	M
035	10" x 10"	36	42	100	11 <sup>3</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>8</sub>	25 <sup>1</sup> / <sub>2</sub>	27	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	14 <sup>7</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>8</sub>
	12" x 12"	40	52	108	13 <sup>7</sup> / <sub>16</sub>	15 <sup>5</sup> / <sub>8</sub>	30 <sup>1</sup> / <sub>4</sub>	37 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	18 <sup>3</sup> / <sub>16</sub>	9 <sup>5</sup> / <sub>16</sub>
070	15" x 15"	40	52	108	15 <sup>7</sup> / <sub>8</sub>	18 <sup>5</sup> / <sub>8</sub>	30 <sup>1</sup> / <sub>4</sub>	37 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	16 <sup>11</sup> / <sub>16</sub>	10 <sup>11</sup> / <sub>16</sub>
	18" x 18"	48	64	114	18 <sup>7</sup> / <sub>8</sub>	21 <sup>7</sup> / <sub>8</sub>	35 <sup>1</sup> / <sub>4</sub>	47 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	21 <sup>1</sup> / <sub>16</sub>	12 <sup>5</sup> / <sub>16</sub>
160	20" x 20"	48	64	134	24 <sup>3</sup> / <sub>4</sub>	24 <sup>3</sup> / <sub>4</sub>	39 <sup>1</sup> / <sub>4</sub>	47 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	19 <sup>5</sup> / <sub>8</sub>	13
	22" x 22"	48	64	134	27 <sup>1</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>4</sub>	39 <sup>1</sup> / <sub>4</sub>	47 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	18 <sup>3</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>16</sub>
Model	Blower Size	Dimensions										
		N	P	Q	R	S	T	U	V	W	Filter Hood Qty - Size	Filter V-Bank Qty - Size
035	10" x 10"	40 <sup>1</sup> / <sub>16</sub>	25 <sup>5</sup> / <sub>8</sub>	27 <sup>7</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	16 <sup>7</sup> / <sub>16</sub>	18 <sup>7</sup> / <sub>8</sub>	26 <sup>7</sup> / <sub>8</sub>	19	27	2) 20" x 25"	4) 20" x 20"
	12" x 12"	50 <sup>1</sup> / <sub>16</sub>	30 <sup>5</sup> / <sub>8</sub>	41 <sup>13</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	17 <sup>3</sup> / <sub>16</sub>	18 <sup>7</sup> / <sub>8</sub>	37 <sup>7</sup> / <sub>8</sub>	19	38	6) 16" x 20"	6) 16" x 25"
070	15" x 15"	50 <sup>1</sup> / <sub>16</sub>	30 <sup>5</sup> / <sub>8</sub>	41 <sup>13</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	13 <sup>5</sup> / <sub>16</sub>	18 <sup>7</sup> / <sub>8</sub>	37 <sup>7</sup> / <sub>8</sub>	19	38		
110	18" x 18"	62 <sup>1</sup> / <sub>16</sub>	35 <sup>5</sup> / <sub>8</sub>	48 <sup>7</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>8</sub>	16 <sup>11</sup> / <sub>16</sub>	19 <sup>7</sup> / <sub>8</sub>	47 <sup>7</sup> / <sub>8</sub>	20	48	6) 20" x 25"	6) 20" x 25"
160	20" x 20"	62 <sup>1</sup> / <sub>16</sub>	44 <sup>7</sup> / <sub>8</sub>	72 <sup>3</sup> / <sub>4</sub>	7 <sup>7</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>4</sub>	24 <sup>7</sup> / <sub>8</sub>	47 <sup>7</sup> / <sub>8</sub>	24 <sup>7</sup> / <sub>8</sub>	48	9) 20" x 25"	12) 20" x 20"
	22" x 22"	62 <sup>1</sup> / <sub>16</sub>	44 <sup>7</sup> / <sub>8</sub>	72 <sup>3</sup> / <sub>4</sub>	7 <sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	24 <sup>7</sup> / <sub>8</sub>	47 <sup>7</sup> / <sub>8</sub>	24 <sup>7</sup> / <sub>8</sub>	48		

**NOTE:** All dimensions in inches subject to manufacturing tolerances.

# Dimensions

## Roof Curbs

C000507



Model	Blower Size	Dimensions							
		A	B	C	D	E	F <sub>1</sub> Standard Height	F <sub>2</sub> Optional Height	
035	10" x 10"	11 <sup>3</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>8</sub>	10 <sup>3</sup> / <sub>16</sub>	10 <sup>3</sup> / <sub>16</sub>	12	18	
070	12" x 12"	13 <sup>7</sup> / <sub>16</sub>	15 <sup>5</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>16</sub>	13 <sup>15</sup> / <sub>16</sub>	13 <sup>15</sup> / <sub>16</sub>	12	18	
	15" x 15"	15 <sup>7</sup> / <sub>8</sub>	18 <sup>5</sup> / <sub>8</sub>	6 <sup>7</sup> / <sub>16</sub>	12 <sup>7</sup> / <sub>16</sub>	12 <sup>7</sup> / <sub>16</sub>			
110	18" x 18"	18 <sup>7</sup> / <sub>8</sub>	21 <sup>7</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>16</sub>	16 <sup>13</sup> / <sub>16</sub>	16 <sup>13</sup> / <sub>16</sub>	12	18	
160	20" x 20"	24 <sup>3</sup> / <sub>4</sub>	24 <sup>3</sup> / <sub>4</sub>	8 <sup>3</sup> / <sub>4</sub>	15 <sup>3</sup> / <sub>8</sub>	15 <sup>3</sup> / <sub>8</sub>	12	18	
	22" x 22"	27 <sup>1</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>4</sub>	9 <sup>13</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>8</sub>			
Model	Blower Size	Dimensions							
		Base Unit Only		Base Unit w/V-Bank		Base Unit w/V-Bank & Return Air			
		L <sub>1</sub>	W <sub>1</sub>	L <sub>2</sub>	W <sub>2</sub>	G	H	L <sub>3</sub>	W <sub>3</sub>
035	10" x 10"	59 <sup>1</sup> / <sub>2</sub>	33 <sup>1</sup> / <sub>2</sub>	91 <sup>1</sup> / <sub>2</sub>	33 <sup>1</sup> / <sub>2</sub>	26 <sup>7</sup> / <sub>8</sub>	18 <sup>7</sup> / <sub>8</sub>	91 <sup>1</sup> / <sub>2</sub>	33 <sup>1</sup> / <sub>2</sub>
070	12" x 12"	67 <sup>1</sup> / <sub>2</sub>	43 <sup>1</sup> / <sub>2</sub>	99 <sup>1</sup> / <sub>2</sub>	43 <sup>1</sup> / <sub>2</sub>	37 <sup>7</sup> / <sub>8</sub>	18 <sup>7</sup> / <sub>8</sub>	99 <sup>1</sup> / <sub>2</sub>	43 <sup>1</sup> / <sub>2</sub>
	15" x 15"								
110	18" x 18"	73 <sup>1</sup> / <sub>2</sub>	55 <sup>1</sup> / <sub>2</sub>	105 <sup>1</sup> / <sub>2</sub>	55 <sup>1</sup> / <sub>2</sub>	47 <sup>7</sup> / <sub>8</sub>	19 <sup>7</sup> / <sub>8</sub>	105 <sup>1</sup> / <sub>2</sub>	55 <sup>1</sup> / <sub>2</sub>
160	20" x 20"	83 <sup>1</sup> / <sub>2</sub>	55 <sup>1</sup> / <sub>2</sub>	115 <sup>1</sup> / <sub>2</sub>	55 <sup>1</sup> / <sub>2</sub>	47 <sup>7</sup> / <sub>8</sub>	24 <sup>7</sup> / <sub>8</sub>	125 <sup>1</sup> / <sub>2</sub>	55 <sup>1</sup> / <sub>2</sub>
	22" x 22"								

**NOTE:** All dimensions in inches subject to manufacturing tolerances.

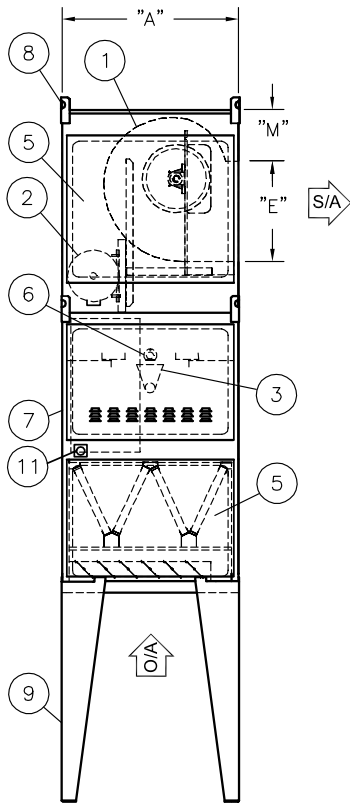
# Dimensions

## Vertical Base Unit with V-Bank

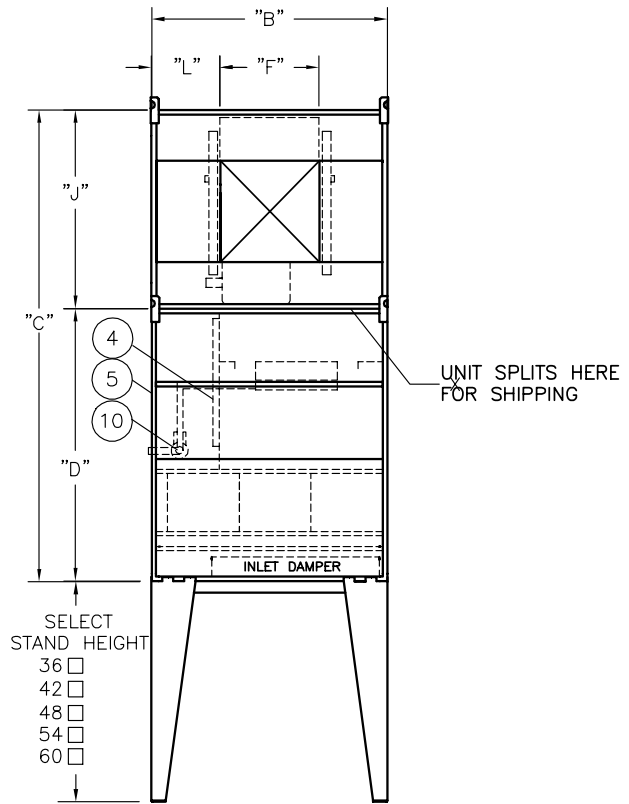
C000547

### UNIT COMPONENTS

- |                           |                       |                          |                          |
|---------------------------|-----------------------|--------------------------|--------------------------|
| 1. Centrifugal supply fan | 4. Control cabinet    | 7. Electrical connection | 10. Manifold compartment |
| 2. Fan motor              | 5. Hinged access door | 8. Lifting lug           | 11. Gas connection       |
| 3. Line burner            | 6. Observation port   | 9. Support stand         |                          |



FRONT VIEW



SIDE VIEW

RIGHT HAND SHOWN, LEFT HAND IS OPPOSITE

Model	Blower Size	Dimensions				
		A	B	C	D	E
035	10" x 10"	36	42	106	76	11 <sup>3</sup> / <sub>8</sub>
070	12" x 12"	40	52	124	84	13 <sup>7</sup> / <sub>16</sub>
	15" x 15"	40	52	124	84	15 <sup>7</sup> / <sub>8</sub>
110	18" x 18"	48	64	122	74	18 <sup>7</sup> / <sub>8</sub>
160	20" x 20"	48	64	128	74	24 <sup>3</sup> / <sub>4</sub>
	22" x 22"	48	64	128	74	27 <sup>1</sup> / <sub>4</sub>
Model	Blower Size	Dimensions				
		F	J	L	M	Filters V-Bank Qty - Size
035	10" x 10"	13 <sup>1</sup> / <sub>8</sub>	30	14 <sup>7</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>8</sub>	4) 20" x 20"
070	12" x 12"	15 <sup>5</sup> / <sub>8</sub>	40	18 <sup>3</sup> / <sub>16</sub>	9 <sup>5</sup> / <sub>16</sub>	6) 16" x 25"
	15" x 15"	18 <sup>5</sup> / <sub>8</sub>	40	16 <sup>11</sup> / <sub>16</sub>	10 <sup>11</sup> / <sub>16</sub>	
110	18" x 18"	21 <sup>7</sup> / <sub>8</sub>	48	21 <sup>1</sup> / <sub>16</sub>	12 <sup>5</sup> / <sub>16</sub>	6) 20" x 25"
160	20" x 20"	24 <sup>3</sup> / <sub>4</sub>	54	19 <sup>5</sup> / <sub>8</sub>	13	12) 20" x 20"
	22" x 22"	27 <sup>1</sup> / <sub>4</sub>	54	18 <sup>3</sup> / <sub>8</sub>	17 <sup>11</sup> / <sub>32</sub>	

**NOTE:** All dimensions in inches subject to manufacturing tolerances.

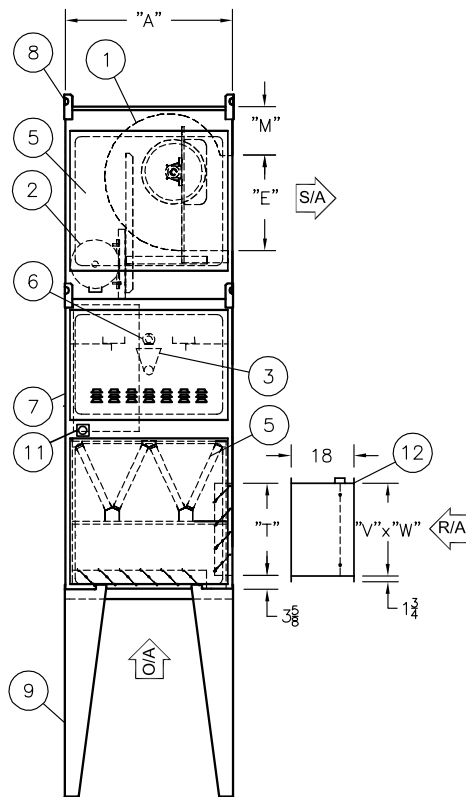
# Dimensions

## Vertical Base Unit with V-Bank and Mixing Dampers

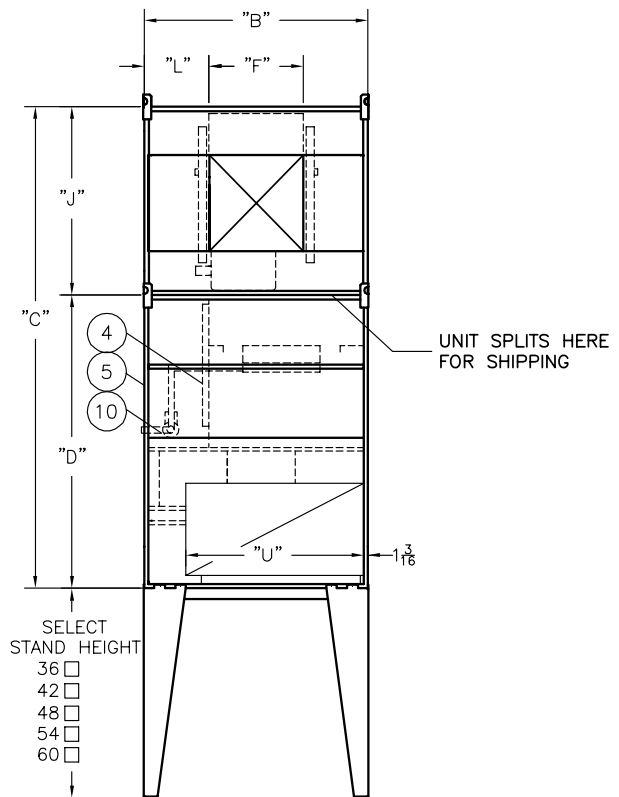
C000548

### UNIT COMPONENTS

- |                           |                       |                          |                          |
|---------------------------|-----------------------|--------------------------|--------------------------|
| 1. Centrifugal supply fan | 4. Control cabinet    | 7. Electrical connection | 10. Manifold compartment |
| 2. Fan motor              | 5. Hinged access door | 8. Lifting lug           | 11. Gas connection       |
| 3. Line burner            | 6. Observation port   | 9. Support stand         | 12. Airflow station      |



FRONT VIEW



SIDE VIEW

RIGHT HAND SHOWN, LEFT HAND IS OPPOSITE

Model	Blower Size	Dimensions						
		A	B	C	D	E	F	J
035	10" x 10"	36	42	106	76	11 <sup>3</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>8</sub>	30
070	12" x 12"	40	52	124	84	13 <sup>7</sup> / <sub>16</sub>	15 <sup>5</sup> / <sub>8</sub>	40
	15" x 15"	40	52	124	84	15 <sup>7</sup> / <sub>8</sub>	18 <sup>5</sup> / <sub>8</sub>	40
110	18" x 18"	48	64	132	84	18 <sup>7</sup> / <sub>8</sub>	21 <sup>7</sup> / <sub>8</sub>	48
160	20" x 20"	48	64	138	84	24 <sup>3</sup> / <sub>4</sub>	24 <sup>3</sup> / <sub>4</sub>	54
	22" x 22"	48	64	138	84	27 <sup>1</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>4</sub>	54

Model	Blower Size	Dimensions						
		L	M	T	U	V	W	Filters V-Bank Qty - Size
035	10" x 10"	14 <sup>7</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>8</sub>	20 <sup>1</sup> / <sub>2</sub>	28 <sup>1</sup> / <sub>2</sub>	19	27	4) 20" x 20"
070	12" x 12"	18 <sup>3</sup> / <sub>16</sub>	9 <sup>5</sup> / <sub>16</sub>	20 <sup>1</sup> / <sub>2</sub>	39 <sup>1</sup> / <sub>2</sub>	19	38	6) 16" x 25"
	15" x 15"	16 <sup>11</sup> / <sub>16</sub>	10 <sup>11</sup> / <sub>16</sub>	20 <sup>1</sup> / <sub>2</sub>	39 <sup>1</sup> / <sub>2</sub>	19	38	
110	18" x 18"	21 <sup>1</sup> / <sub>16</sub>	12 <sup>5</sup> / <sub>16</sub>	21 <sup>1</sup> / <sub>2</sub>	49 <sup>1</sup> / <sub>2</sub>	20	48	6) 20" x 25"
160	20" x 20"	19 <sup>5</sup> / <sub>8</sub>	13	26 <sup>1</sup> / <sub>2</sub>	49 <sup>1</sup> / <sub>2</sub>	24 <sup>7</sup> / <sub>8</sub>	48	12) 20" x 20"
	22" x 22"	18 <sup>3</sup> / <sub>8</sub>	17 <sup>11</sup> / <sub>32</sub>	26 <sup>1</sup> / <sub>2</sub>	49 <sup>1</sup> / <sub>2</sub>	24 <sup>7</sup> / <sub>8</sub>	48	

**NOTE:** All dimensions in inches subject to manufacturing tolerances.

## MDT Control System

C000635

### Application:

Modulating Discharge  
Temperature Control

### Includes:

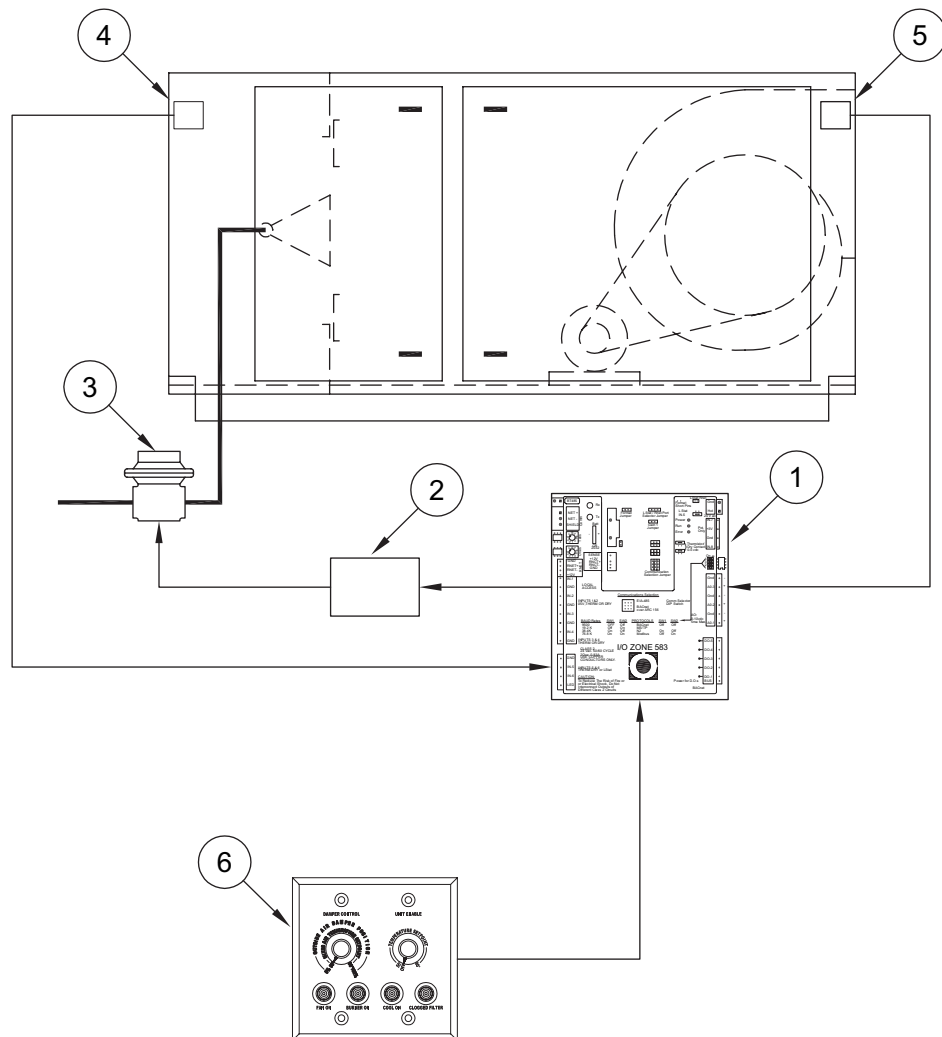
Discharge air sensor <sup>⑤</sup> mounted in unit discharge with remote mounted 4 x 4 box cover <sup>⑥</sup> including manual potentiometer to enable unit and adjust temperature setpoint, Fan On Light, Burner On Light and Cool On Light. Additional potentiometer is provided if optional return air damper section for manual or mixed air control is ordered.

### COMPONENT I.D.

- 1. Unit DDC Controller
- 2. Signal Conditioner

- 3. Modulating Gas Valve
- 4. Inlet Air Sensor

- 5. Discharge Air Sensor
- 6. Remote Control Station



Discharge Temperature  
SET Here

## MRT Control System

C000634

### Application:

Modulating Room  
Temperature Control

### Includes:

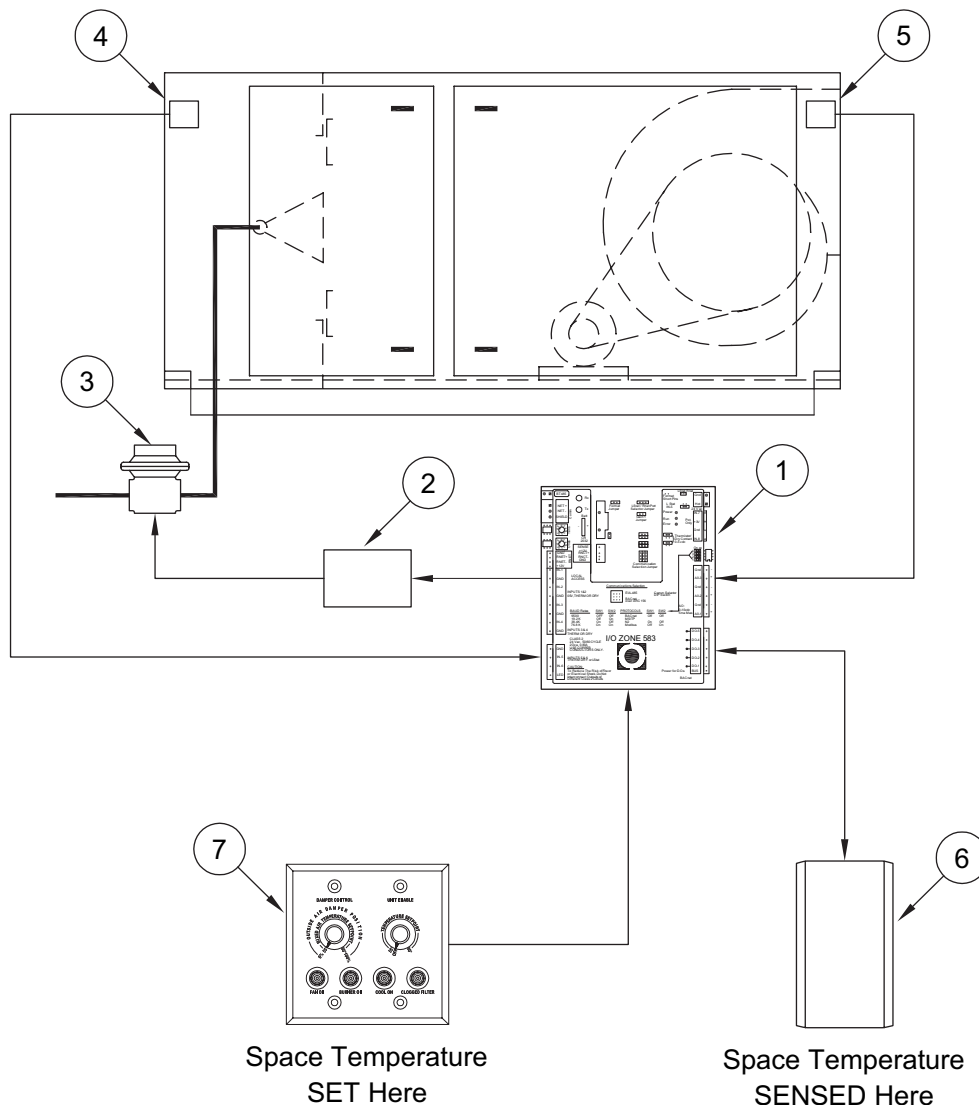
Discharge air sensor <sup>⑤</sup> mounted in unit discharge with remote mounted 4 x 4 box cover <sup>⑦</sup> including manual potentiometer to enable unit and adjust temperature setpoint, Fan On Light, Burner On Light and Cool On Light. Also includes RS-std room sensor <sup>⑥</sup> (does not allow remote room setpoint adjustment). Additional potentiometer is provided if optional return air damper section for manual or mixed air control is ordered.

### COMPONENT I.D.

1. Unit DDC Controller  
2. Signal Conditioner

3. Modulating Gas Valve  
4. Inlet Air Sensor

5. Discharge Air Sensor  
6. Room Thermostat  
7. Remote Control Station



## MRT Pro Control System

C000633

### Application:

Modulating Room Temperature Control with RS-Pro room sensor allowing after hours unit enable, room setpoint adjustment, and digital temperature readout.

### Includes:

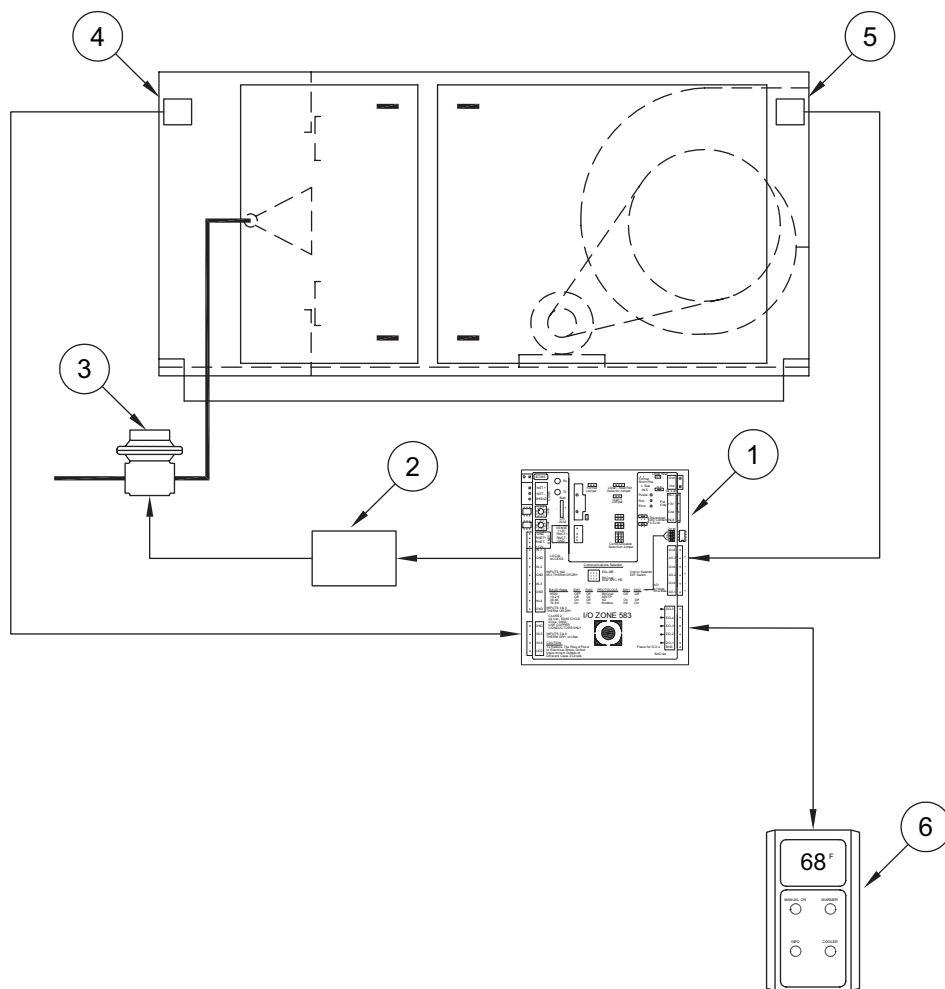
Discharge air sensor<sup>⑤</sup> mounted in unit discharge with remote mounted RS-Pro room sensor<sup>⑥</sup> with push buttons for room setpoint adjustment and digital temperature readout. On units with optional return air damper section a remote mounted 4 x 4 box cover is provided with potentiometer for manual or mixed air control.

### COMPONENT I.D.

- 1. Unit DDC Controller
- 2. Signal Conditioner

- 3. Modulating Gas Valve
- 4. Inlet Air Sensor

- 5. Discharge Air Sensor
- 6. Room Thermostat



Space Temperature  
SET And SENSED Here



## MRT Expert Control System

C000632

### Application:

Modulating Room Temperature Control with BACview controller allowing after hours unit enable, room setpoint adjustment, operating feedback, monitoring of alarm status and digital temperature readout with RS-std room sensor.

### Includes:

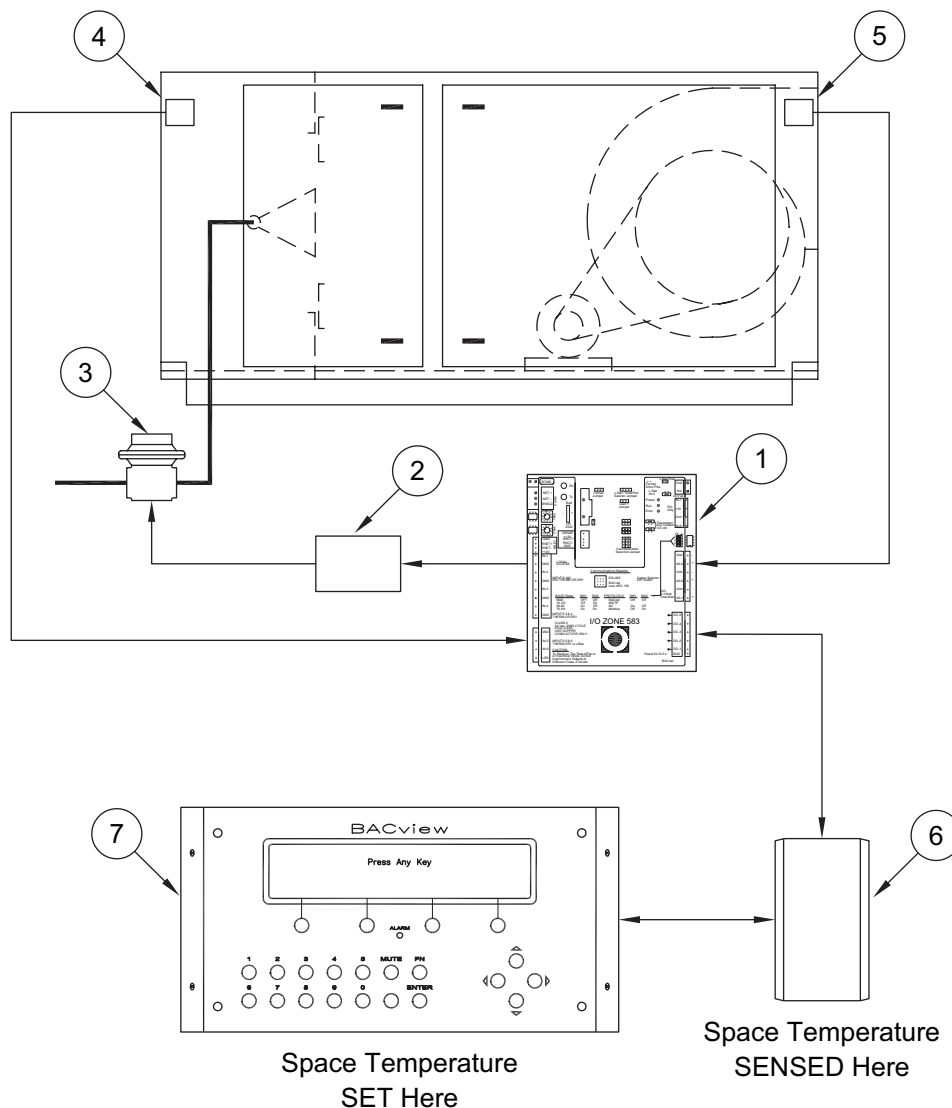
Discharge air sensor <sup>⑤</sup> mounted in unit discharge with remote mounted BACview controller <sup>⑦</sup> to set space temperature, operating schedules, and optional damper control setpoints. Service information, operating feedback and alarm status can also be monitored. Also includes a RS-std room sensor <sup>⑥</sup>.

### COMPONENT I.D.

- 1. Unit DDC Controller
- 2. Signal Conditioner

- 3. Modulating Gas Valve
- 4. Inlet Air Sensor

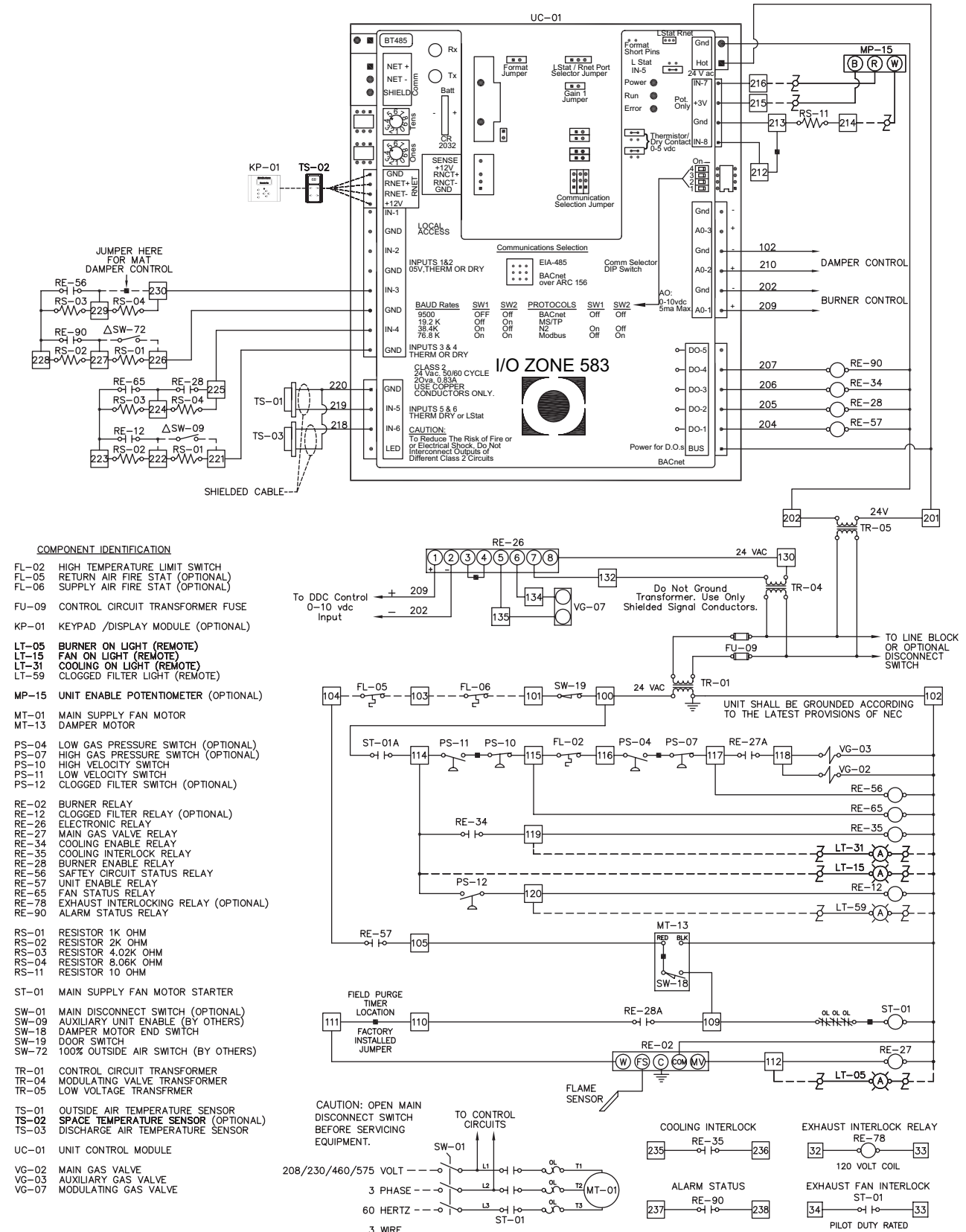
- 5. Discharge Air Sensor
- 6. Room Thermostat
- 7. BACView Interface



# Wiring Diagram

## Typical Wiring Diagram - Make-Up Air Unit

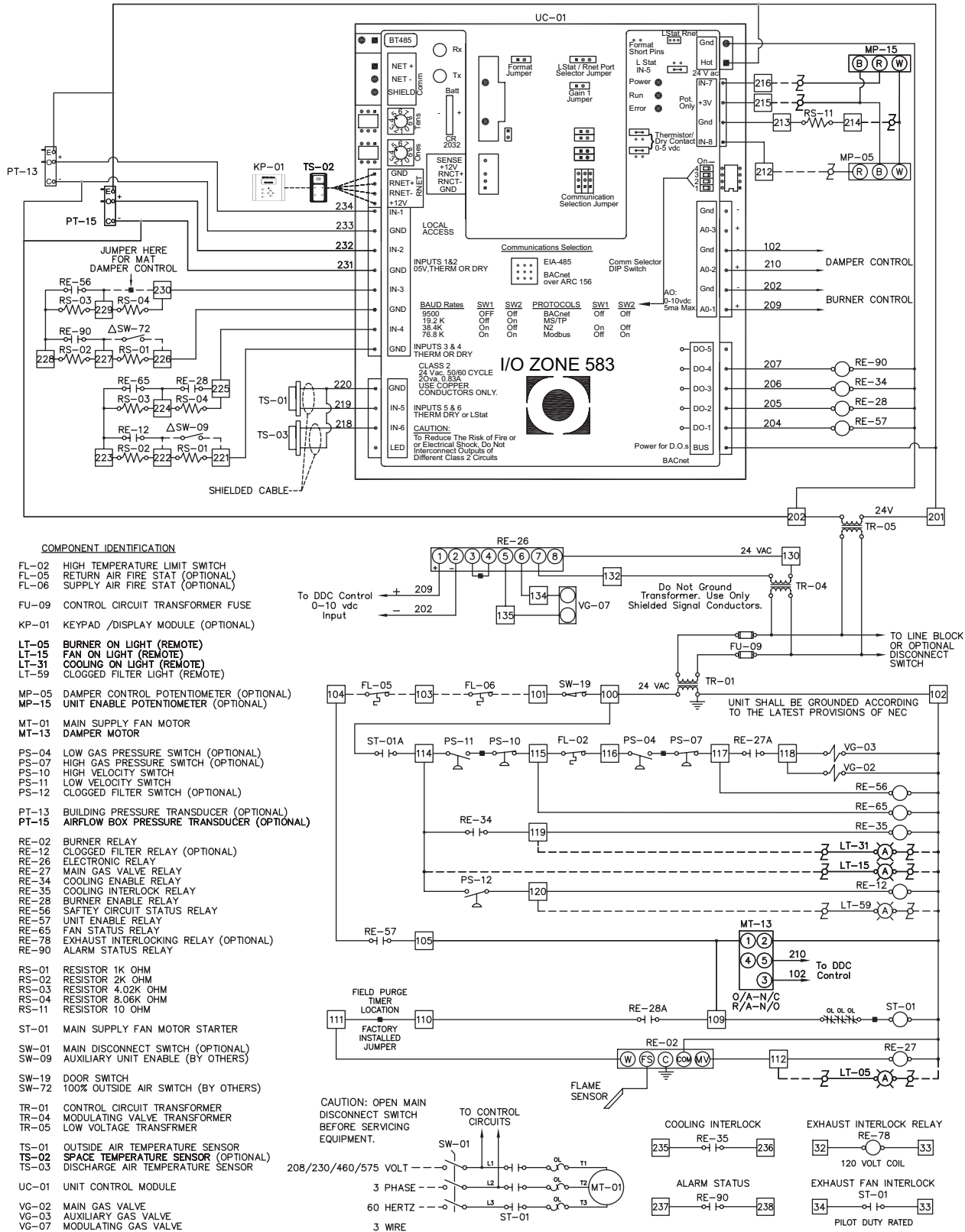
C000628



# Wiring Diagram

## Typical Wiring Diagram - Return Air Unit

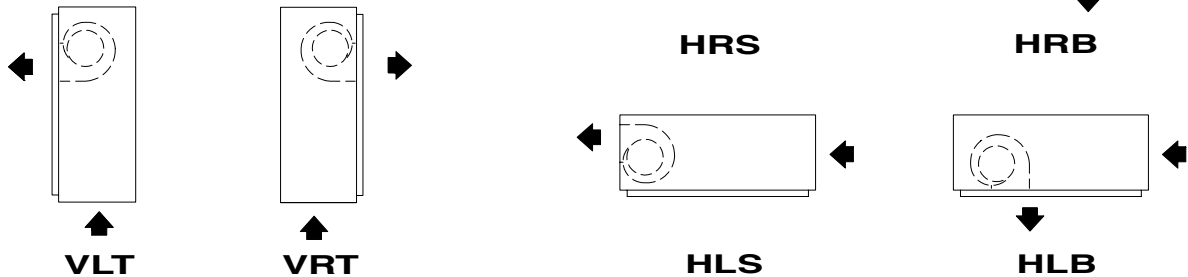
C000629



# Cabinet Arrangements and Electrical Data

## Cabinet Arrangement

For all arrangements shown, controls are on near side.



## Amp Draw Table

ITEM	SOURCE	AMPS									
		Motor HP	1	1½	2	3	5	7½	10	15	20
A	Blower Motor	AMPS for 115V 1 Ph.	12.4	18.0	24.0	32.0	NA	NA	NA	NA	NA
		AMPS for 230V 1 Ph.	6.2	9.0	12.0	16.0	NA	NA	NA	NA	NA
		AMPS for 208V 3 Ph.	3.1	4.5	5.9	8.7	13.7	22.2	28.2	44.8	61.2
		AMPS for 230V 3 Ph.	2.8	4.2	5.6	8.0	13.2	21.6	28.0	40.6	50.0
		AMPS for 460V 3 Ph.	1.4	2.1	2.8	4.0	6.6	10.8	14.0	20.3	25.0
B	Controls	AMPS for 575V 3 Ph.	1.1	1.7	2.2	3.2	5.3	8.2	11.0	16.2	20.0

Allow 2 AMPS Maximum

To size optional disconnect switch, add amps from ITEM A and B from above table, then multiply by 1.15

## Pre-Purge Timing

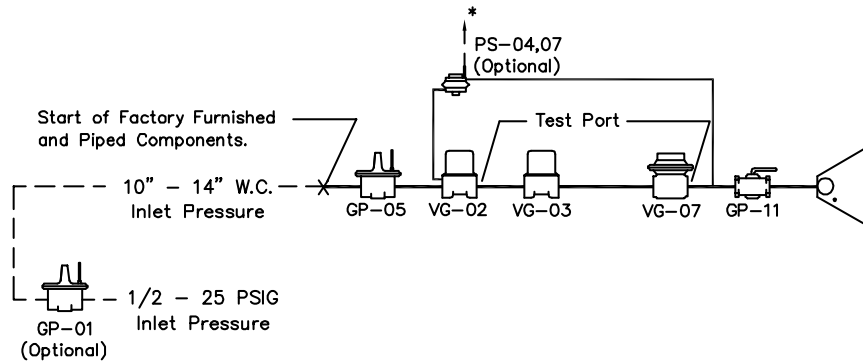
The standard unit is provided with a 10 second pre-purge timer which is good for all rooftop units without inlet duct work. If inlet duct is attached to heater, ANSI requirements stipulate that the inlet duct must be purged four times prior to trial for ignition. to calculate the maximum allowable inlet duct length, use:

$$\text{Maximum Inlet Duct Length (feet)} = \text{Inlet Duct Velocity (FPM)} / 24$$

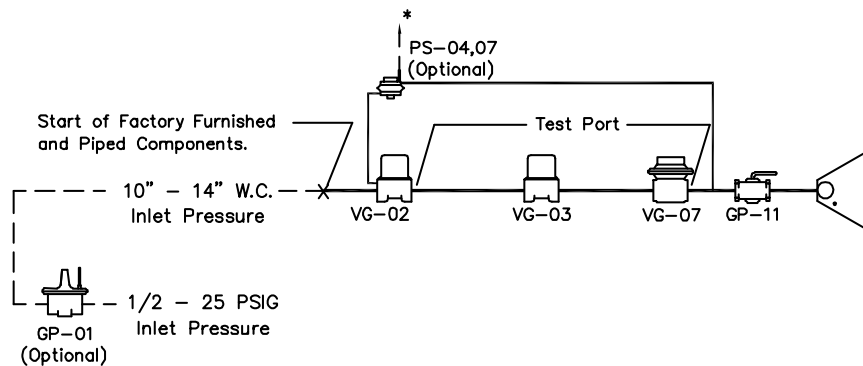
# Gas Piping Layout

## Schematic Component Diagrams

C000504



MODULATING GAS TRAIN UP TO 950 MBH



MODULATING GAS TRAIN OVER 950 MBH

### COMPONENT IDENTIFICATION

GP-01 HIGH GAS PRESSURE REGULATOR  
GP-05 MAIN GAS PRESSURE REGULATOR  
GP-11 MAIN GAS SHUT-OFF VALVE

VG-02 MAIN GAS VALVE  
VG-03 AUXILIARY GAS VALVE  
VG-07 MODULATING VALVE

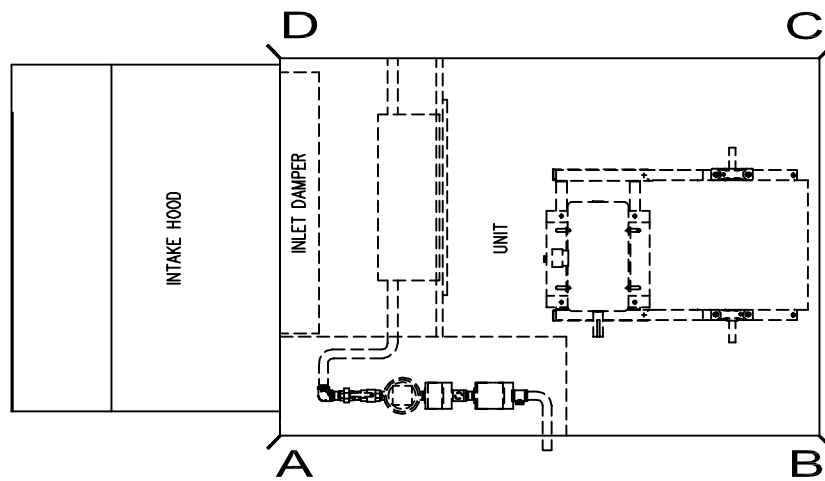
PS-04 LOW GAS PRESSURE SWITCH  
PS-07 HIGH GAS PRESSURE SWITCH

### NOTES:

1. Vent limiting devices provided wherever possible, when venting is required the venting to outside is by others on indoor units and furnished by factory on outdoor units.
2. For inlet pressures under 10" W.C. — Please consult factory.
3. The standard ETL Listed unit meets ANSI, FM and IRI requirements.

## Horizontal Unit Weights (Approximate)

C000508



PLAN VIEW HORIZONTAL UNIT  
WITHOUT V-BANK

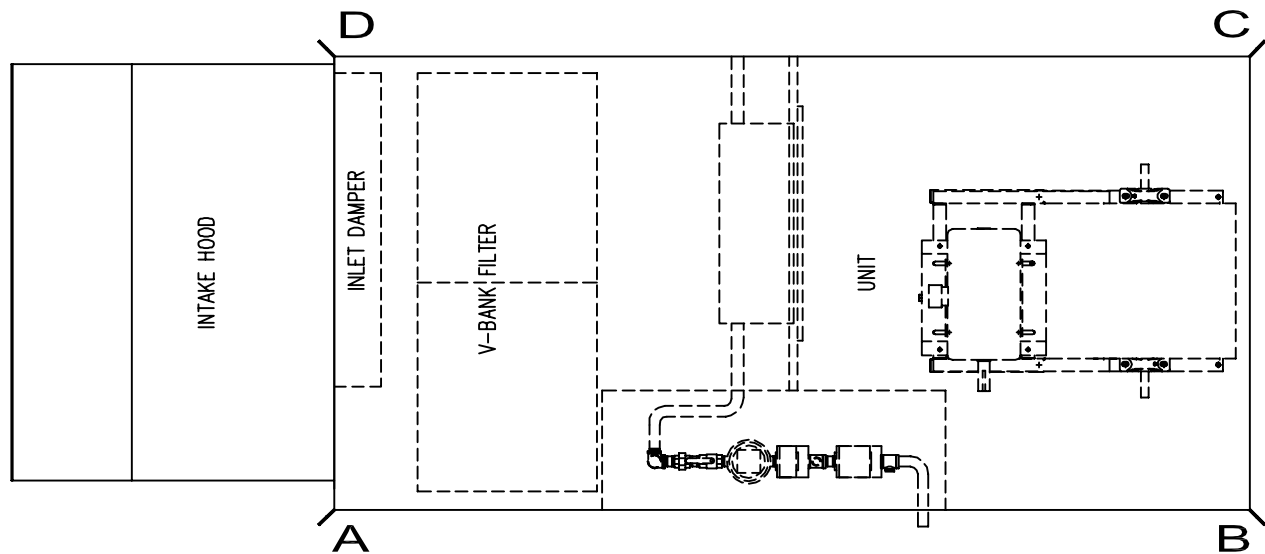
Model	Base Unit without V-Bank				Shipping Crate	Inlet Hood (No Filters)
	A	B	C	D		
035	199 White	195 White	141 Red	150 Red	253	65
070	256 White	260 White	192 White	204 White	311	120
110	363 Yellow	382 Yellow	325 Yellow	300 Yellow	402	167
160	453 Yellow	430 Yellow	328 Yellow	365 Yellow	449	259

**NOTE:** Color shown under corner weights indicates proper optional hanger isolator.

# Weights

## Horizontal Unit Weights (Approximate)

C000508



PLAN VIEW HORIZONTAL UNIT  
WITH V-BANK

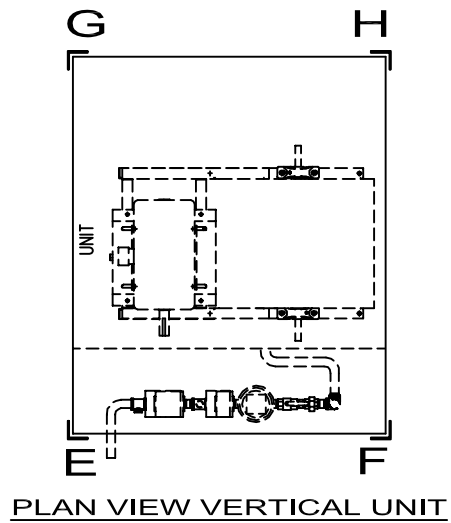
Model	Base Unit with V-Bank				Base Unit with V-Bank & Return Damper				Shipping Crate	Inlet Hood (No Filters)
	A	B	C	D	A	B	C	D		
035	223 White	259 White	183 White	173 Red	235 White	259 White	183 White	185 Red	316	65
070	297 White	334 White	242 White	234 White	314 White	334 White	242 White	251 White	402	120
110	399 Yellow	478 Yellow	396 Yellow	328 Yellow	448 Yellow	478 Yellow	396 Yellow	377 Yellow	535	167
160	491 Yellow	543 Yellow	410 Yellow	401 Yellow	551 Yellow	543 Yellow	410 Yellow	461 Yellow	576	259

**NOTE:** Color shown under corner weights indicates proper optional hanger isolator.

# Weights

## Vertical Unit Weights (Approximate)

C000508



Model	Base Unit with V-Bank				Base Unit with V-Bank & Return Damper				Shipping Crate	36" Stand (See Note)
	E	F	G	H	E	F	G	H		
035	234	214	151	180	239	219	164	180	316	178
070	354	337	263	264	363	346	271	272	402	183
110	508	435	349	393	535	462	371	415	535	190
160	627	487	389	456	659	520	416	483	576	190

**NOTE:** Multiply times following factors for other heights: 42" - 1.17, 48" - 1.33, 54" - 1.50, 60" - 1.67



# Guide Specification – Base Unit

## Applied Air

Base Bid Applied Air Model DFL \_\_\_\_\_ make-up air unit(s) designed for outdoor application. The unit discharge shall be designed for easy adaptation to external ductwork or optional accessories. The unit(s) shall be capable of delivering \_\_\_\_\_ SCFM at \_\_\_\_\_ TSP using a \_\_\_\_\_ horsepower (ODP) (TEFC) motor operating on (115/1/60)(230/1/60) (208/3/60) (230/3/60) (460/3/60)(575/3/60).

### BURNER SECTION

The line burner shall be capable of delivering \_\_\_\_\_ BTUH firing on (natural gas)(propane) at an inlet pressure of \_\_\_\_\_ (inches water column) (PSIG). The standard ETL listed unit will meet ANSI, FM, and IRI requirements. Both burner and blower shall be compensated for an altitude of \_\_\_\_\_ feet above sea level. Manifold to be located outside of air stream and shielded from atmospheric conditions by means of a protective compartment with hinged access. An observation port shall be located to provide view of main flame.

Unit(s) shall be supplied with wide range burner with a modulating turndown ration of 25:1. Adjustable profile plates shall be provided and sized to maintain the required velocity across the line burner. The operation of the burner shall be programmed through the ignition controller with timed prepurge and flame sensed by means of a flame rod.

The burner assembly and gas manifold shall be completely prepiped and factory tested prior to shipment.

The unit shall be controlled by the AdaptAire DDC control module with full BACnet compatibility. Unit shall have the AdaptAire (MDT - Modulating Discharge Temperature Control System)(MRT – Modulating Room Temperature Control System)(MRT-Pro Modulating Room Pro Temperature Control System)(MRT-Expert Modulating Room Expert Temperature Control System). The AdaptAire DDC control system shall include but not be limited to the following controls required for standard operation:

- Electronic time clock with normal, holiday, and override schedules. (Optional accessory on MDT or MRT Control Systems).
- Timed freeze protection to prevent heater from discharging unheated air into the building.
- Inlet On-Off ductstat which will turn burner off when inlet temperature equals desired discharge air temperature as fuel savings mode.
- On-Off night setback thermostat for lower operating temperatures in unoccupied mode as fuel savings mode. (Optional accessory on MDT or MRT Control Systems).

### UNIT CASING

Unit casing and accessories shall be fabricated from heavy-gauge galvanized steel panels and extruded aluminum frame. The base of the unit shall be formed of heavy-gauge galvanized steel with built in curb adapter

(horizontal units only). All casings shall be airtight and weatherproof. Roof panels shall be convex to prevent ponding, and designed with a standing seam to prevent water entrainment. Cabinet shall be designed with roof eaves to prevent water from getting into wall panels. Complete access shall be provided to all components through gasketed, hinged access doors. This includes the motor, blower, burner, electrical components and manifold sections.

### BLOWER SECTION

Each unit shall be supplied with centrifugal forward curve, DWDI fan rated in accordance with AMCA standards. The fan shall be mounted on a heavy-duty polished steel shaft designed for a maximum operating speed not to exceed 75% of its first critical speed. Bearings are to be heavy-duty industrial prelubricated type. Blowers to be driven by a V-belt package sized with a capacity of 25% greater than the motor horsepower. Multiple belt applications will be matched sets. Drives are to be (fixed)(adjustable). Motor to be mounted on adjustable slide base. Door safety interlock switch shall be provided for protection when blower access door is opened.

### CONTROL ENCLOSURE

The unit(s) shall be supplied with a control compartment and all controls mounted within this compartment are to be wired to a numbered terminal strip. All wiring is to be color coded in accordance with the NEC. A circuit diagram is to be laminated to the inside of the control cabinet door. All electrical components shall bear a recognized label.

### CONTROLS

1. Main fan starter and overloads
2. Control circuit fusing
3. High temperature limit switch
4. Flame rod sensor
5. Ignition module
6. Main gas automatic shutoff valves
7. MDT Control System
8. Air proving differential switches
9. Factory wired motorized inlet damper complete with end switch
10. Control transformer
11. Remote control panel

### OPTIONAL ACCESSORIES

1. V-bank filter box with filters
2. Inlet hood and birdscreen with or without filters
3. Insulation
4. Full perimeter roof curb (horizontal units only)
5. Vibration hangers
6. Clogged filter switch
7. Disconnect switch
8. 20 gauge liners
9. High gas pressure regulator (required for inlet pressures over 1/2 PSIG)
10. Vertical arrangement with support stand and inlet birdscreen
11. Mixing dampers with return air flow station
12. Internal blower/motor isolation (horizontal units only)
13. Discharge nozzles
14. Firestat
15. 115 Volt service receptacle
16. BACview Controller

# Guide Specification – Mixing Dampers With Return Air Flow Station



## Applied Air

Unit(s) shall have outside air and return air dampers with modulating actuator controlled by AdaptAire DDC control system. The AdaptAire DDC control system shall have capability to digitally control the outside air quantity from a nominal minimum of 20% to 100% with integrated gas valve control at all room concentrations of CO<sub>2</sub>.

The return air inlet shall include a self-calibrating flow measuring station with a grid of velocity pressure probes with spacing no greater than 12" over the entire face of the return air opening and sampled every two seconds. Samples will be added to a twenty-five point rolling average and then on to a second rolling average to provide smooth, accurate data that is delivered to the AdaptAire DDC control system every two seconds. The DDC control system shall be capable of electronically displaying the return air/outside air ratio within 5% accuracy at all damper positions.

The AdaptAire DDC control system shall be capable of controlling mixing dampers in: (Choose One)

**Manual Mode:** The "Manual" mode allows manual positioning of the outside air (O.A.) damper and return air (R.A.) damper by changing the damper position setpoint.

**Mixed Air Temperature Mode:** The "Mixed Air Temperature" mode shall provide automatic control of the mixed air temperature by modulating the outside air (O.A.) damper and return air (R.A.) damper to maintain the mixed air temperature setpoint. As the mixed air temperature increases above the setpoint more outside air will be introduced.

**Building Pressure Mode:** The "Building Pressure" mode shall provide automatic building pressure control by modulating the outside air (O.A.) damper and return air (R.A.) damper to maintain the indoor building pressure setpoint. As the building pressure decreases below the setpoint more outside air will be introduced.

# Guide Specification – BACview Controller



The display functions of the remote keyboard display for the AdaptAire DDC control system shall have a minimum of two lines, sixteen character display which shall include but not limited to the following:

- Return air temperature
- Outside air temperature
- Discharge air temperature
- Mixed air temperature
- Maximum allowable temperature rise
- Actual temperature rise
- Current percent of outside air
- Current building pressure (optional)
- Current damper input voltage (optional)
- Current burner input voltage
- Fan operating hours since last reset
- Fan start cycle count since last reset
- Burner operating hours since last reset
- Burner start cycle count since last reset
- Cooling interlock operating hours since last reset
- Cooling interlock cycle count since last reset
- Critical alarm conditions:
  - o Airflow switch failure
  - o Unit on, fan off
  - o Unit off, fan on
  - o Low discharge temperature
  - o Safety circuit open
  - o Burner jumped

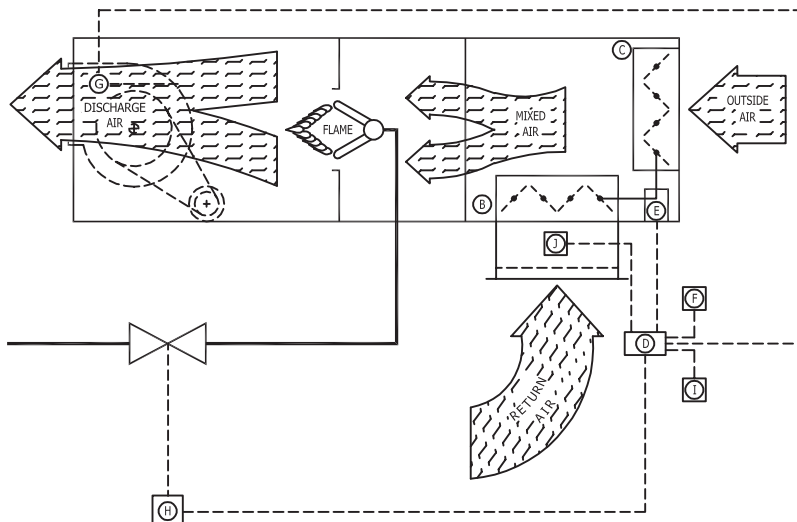
The control settings available on the remote keyboard display for the AdaptAire DDC control system shall include but not be limited to the following:

- Heating setpoint
- Cooling setpoint
- Economizer options
- Setback setpoint
- Freeze protection setpoint
- Maximum discharge air temperature setpoint
- Minimum discharge air temperature setpoint
- Minimum ventilation option and setpoint
- Time of day schedule selection and setpoints (Not available on MDT or MRT Control Systems)
  - o Normal 5/7 schedule
  - o Holiday schedule
  - o Manual override

## Sequence of Operation – Return Air Units

P000621

### OPERATION WITH RETURN AIR UPSTREAM OF BURNER



Signal from remote control I to AdaptAire Controller D, sets operational parameters for dampers B and C, and burner. Damper operation can be manual, building pressure or mixed air temperature.

Return air dampers B, and outside air dampers C, are interlocked to move together. As one opens, the other closes. As the return air dampers open, allowing more return air to enter the unit, the outside air dampers move toward the closed position, decreasing the amount of outside air. Pressure sensor and flow station J, senses change in return airflow and signals AdaptAire Controller D.

Modulating gas valve H, regulates gas supply in response to signal from AdaptAire Controller D. AdaptAire Controller D, varies signal based on input from room temperature sensor F, discharge temperature sensor G, and airflow sensor J. Gas valve H can provide approximately 4% to 100% of rated burner capacity.



# Applied Air



## Efficient Direct Fired Gas Heating System

### Choose Applied Air Direct Fired Gas Heating

- Heat large or small spaces with 100% combustion efficiency
- Constantly replace contaminated indoor air with fresh, heated outside air
- Optional evaporative cooling
- Low operating and maintenance costs
- Fresh air ventilation anytime — just turn off the gas heating system
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- Applied Air, a leader in research, engineering, and customer service since 1975
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